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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,545	12/13/2006	Nobuhiko Masaki	050203-0143	7405
31824 7590 09/10/2007 MCDERMOTT WILL & EMERY LLP 18191 VON KARMAN AVE. SUITE 500 IRVINE, CA 92612-7108			EXAMINER NGUYEN, TU MINH	
			ART UNIT 3748	PAPER NUMBER
			MAIL DATE 09/10/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/572,545

Applicant(s)

MASAKI ET AL.

Examiner

Tu M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 20060317, 20070221.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Mahr (U.S. Patent 6,382,600).**

Re claim 1, as shown in Figure 1, Mahr discloses an exhaust gas purification apparatus of an engine comprising:

- a reduction catalyst (reduction catalytic converter) that is arranged in an exhaust system of the engine, for reducing and purifying nitrogen oxide in an exhaust gas using a reducing agent (urea solution); and

- a reducing agent supplier (4) provided with an injection nozzle having a tip end portion, which extends towards a downstream side in an exhaust gas passage (2) of the exhaust system, substantially parallel with an exhaust gas flow direction, for supplying the reducing agent to an exhaust gas on upstream side of the reduction catalyst;

wherein an exhaust gas downstream side end portion of the tip end portion of the injection nozzle has an exhaust gas downstream side end surface that is blocked (by a spray head (6)), and a ring shaped protruding ridge (spray head (6)) is provided on an outer peripheral

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surface of the exhaust gas downstream side end portion, the protruding ridge portion being formed with at least one injection hole (8) for ejecting the reducing agent in an outward direction from an axial center of the injection nozzle.

Re claim 2, in the apparatus of Mahr, the protruding ridge portion (6) is formed with a plurality of the injection holes (8) that are drilled in a radial pattern in an outward direction from the axial center of the tip end portion of the injection nozzle.

Re claim 3, in the apparatus of Mahr, the injection hole (8) is drilled diagonally in a direction tilted towards the downstream side with respect to the exhaust gas flow direction (the angle  $\alpha$  is less than  $90^\circ$  relative to the axial center).

Re claim 4, in the apparatus of Mahr, the ring shaped protruding ridge (6) is formed in a shape that is tapered towards an outer peripheral surface, as clearly shown in Figure 1.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vidusek (U.S. Patent 5,176,325) in view of Mahr.**

Re claim 1, as illustrated in Figures 1-3, Vidusek discloses an exhaust gas purification apparatus of an engine (power plant) comprising a reducing agent supplier provided with an

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injection nozzle (10) having a tip end portion (40), which extends towards a downstream side in an exhaust gas passage (11) of the exhaust system, substantially parallel with an exhaust gas flow direction, for supplying the reducing agent (lime hydrate slurries) to an exhaust gas;

wherein an exhaust gas downstream side end portion of the tip end portion (40) of the injection nozzle has an exhaust gas downstream side end surface that is partially blocked (by an orifice plate (40)), and a ring shaped protruding ridge (18) is provided on an outer peripheral surface of the exhaust gas downstream side end portion, the protruding ridge portion being formed with at least one injection hole (55) for ejecting the reducing agent in an outward direction from an axial center of the injection nozzle.

Vidusek, however, fails to disclose that the apparatus further comprises a reduction catalyst that is arranged in an exhaust system of the engine, for reducing and purifying nitrogen oxide in an exhaust gas using a reducing agent.

As shown in Figure 1, Mahr discloses a device for introducing a reducing agent into an exhaust pipe segment of an internal combustion engine, comprising a nozzle (4) with a spray head (6) at the end of the nozzle adapted to introduce a reducing agent into the exhaust pipe segment (2). As indicated in the Abstract, Mahr teaches that it is conventional in the art to include a reduction catalyst arranged downstream from the nozzle for reducing and purifying NO<sub>x</sub> emissions in an exhaust gas stream. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the reduction catalyst taught by Mahr in the apparatus of Vidusek, since the use thereof would have been routinely practiced by those with ordinary skill in the art to increase a purification efficiency by using a

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catalyst to increase a chemical reaction rate between the reducing agent and the emissions in the exhaust gas stream.

Re claim 2, in the modified apparatus of Vidusek, the protruding ridge portion (18) is formed with a plurality of the injection holes (55) that are drilled in a radial pattern in an outward direction from the axial center of the tip end portion of the injection nozzle.

Re claim 3, in the modified apparatus of Vidusek, the injection hole (55) is drilled diagonally in a direction tilted towards the downstream side with respect to the exhaust gas flow direction, as clearly shown in Figure 2.

Re claim 4, in the modified apparatus of Vidusek, the ring shaped protruding ridge (18) is formed in a shape that is tapered towards an outer peripheral surface.

#### ***Prior Art***

5. The IDS (PTO-1449) filed on March 17, 2006 and February 21, 2007 have been considered. An initialized copy of each is attached hereto.
6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents: Vidusek (U.S. Patent 5,372,312), Slavas et al. (U.S. Patent 5,553,783), Berriman et al. (U.S. Patent 5,992,141), and Haruch (U.S. Patent 6,098,896) further disclose a state of the art.

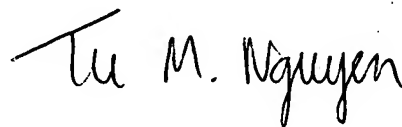
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*Communication*

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

Tu M. Nguyen

September 4, 2007

Primary Examiner

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